

INDIVIDUAL DIFFERENCES IN SECOND LANGUAGE LEARNING

Peter Skehan

Ealing College, London

This article is broadly concerned with the differences between individual language learners. In terms of particular content areas of Individual Differences (ID) research, it surveys developments in foreign language aptitude, motivation, learner strategies, and learner styles. A brief review of earlier research on aptitude is presented, followed by discussions of more contemporary work on the origin of aptitude, namely, as a residue of first language learning ability, and on the existence of evidence for "learner types." Motivation research is reviewed partly with regard to Robert Gardner's research, and then in terms of a wider framework for the functioning of motivation within an educational context. The review of learner strategies research emphasizes current attempts to develop taxonomies of such strategies, and to investigate their theoretical basis and their trainability. Finally, learner styles research, drawing on field independence theory, is discussed, and links are made with the research on aptitude. The article finishes with sections on conceptual and methodological issues in ID research.

Psychology has long recognized two contrasting approaches to the study of human functioning—the experimental and the differential. The former focuses on identifying structures and processes common to everyone, and is typically associated with a prediction-oriented, hypothesis-testing view of science based on experimental control and manipulation of variables. It is likely to involve model making and tests of the goodness-of-fit of such models against obtained results. In contrast, the latter approach emphasizes differences between people, seeking to identify the most relevant major ways that people vary. The second approach is more likely to try and identify attributes on which people differ (e.g., aptitude) and then relate such attributes to different performances in, for example, learning. Theory-based prediction and manipulation are less important, and model making is more likely to involve specifying chains of causation between variables.

The two approaches have their strengths and weaknesses, but for the moment,

L-functions; morphosyntax/S-chi-square/Interp.

Diary
Transcripts
Introspection
Case study

Learning strategies

the major point that needs to be made is that most research in applied linguistics and second language acquisition has been of the former type. Linguistics, for example, has tended to emphasize common, even universal, features in language (especially syntax), and the autonomy and modularity of the language system. Similarly, in pedagogy, researchers have attempted to identify the general (and even unique) "best methodology," or best approach to teaching, with less attention being paid to constraints on the operation of (say) methodology or on the way it may affect some people in different ways. In studies more directly concerned with acquisition, researchers have tried to identify universal sequences in development, or common processes, such as transfer, cross-linguistic interference, overgeneralization, fossilization, and so forth, that affect everyone in the same way. In contrast, far fewer studies have been conducted into the *differences* between language learners. This tradition has been represented by a much smaller volume of research, and has consequently had a smaller impact. The present article will, nonetheless, try and review what progress has been made in this area.

The article will focus on four areas where Individual Differences (IDs) have been shown to be important. (There are others that deserve mention, but that are not covered due to lack of space.) These are language aptitude, motivation, learner strategies, and learner styles. The four areas have been chosen partly because of their judged importance and relevance for acquisition research and partly because they enable important issues to be discussed about ID research in general and the methodology it employs. Consequently, after the discussion of each of these four areas, attention is given to conceptual and methodological issues in ID research.

The four areas can be located within a larger model, as shown in Figure 1. The model suggests that learner strategies and learner styles have an intermediate position between variables such as aptitude and motivation, on the one hand, and outcome, on the other. The implication is (see, e.g., Willing, 1987) that strategies and style can mediate the influence of variables such as aptitude, and so it is convenient to conceive of the different IDs as being organized in this way. We shall see, however, that one of the interesting developments in ID research is to move from regarding influences, such as aptitude, as invariant and unidirectional in influence (i.e., "pre-sage variables") and instead seeing how instruction can be adapted to take account of the characteristics of learners, and thereby become more efficient.

LANGUAGE APTITUDE

To discuss language aptitude is to imply that:

1. there is a talent for learning languages that is independent of intelligence;
2. the talent is not simply the result of previous learning experiences;
3. it is relatively stable; and
4. it varies between people.

If these conditions are met, it implies that the study of aptitude may be important practically, since it enables predictions of learning success, and theoretically, since it is important to explain what is specific about a foreign language learning ability.

Aptitude
Motivation
IQ
Personality
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Figure 1. Influences

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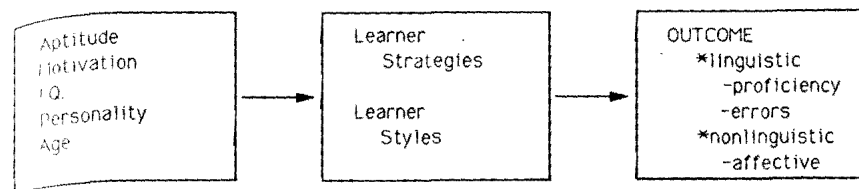


Figure 1. Influences on language learning.

The most significant era in the study of aptitude must still be considered to be the 1950s and 1960s, when two major aptitude batteries were published. These were Carroll and Sapon's (1957) Modern Languages Aptitude Test (MLAT), and Pimsleur's Language Aptitude Battery (1966). Work in this period tended to use the research design of administering large numbers of potential predictor tests to language learners and then examining patterns of results. These patterns were, first of all, internal to the aptitude battery, as the interrelationships of the aptitude tests were investigated, and then external, as the aptitude tests related to the criterion scores obtained after a course of language training.

On the basis of such a research methodology, Carroll (1965) proposed a four-factor theory of aptitude consisting of:

Phonemic coding ability: not simply the capacity to make sound discriminations, but also to code foreign sounds in such a way that they can be recalled later.

Associative memory: the ability to bond or make connections between stimuli (native language words) and responses (target language words).

Grammatical sensitivity: the ability to recognize the functions that words fulfill in sentences (N.B., *not* the ability to analyze sentences overtly).

Inductive language learning ability: the ability to examine language materials and from this to notice and identify patterns of correspondence and relationships involving either meaning or syntactic form.

This conception of aptitude, therefore, suggests that a talent for learning languages is not an undifferentiated ability, but that it has several component parts that may vary relatively independently, with the consequence that there may be *patterns* of aptitude. This line of thought was pursued by Pimsleur (Pimsleur, Sundland, & McIntyre, 1966) who proposed that underachievement at the high school level of foreign language learning was often due to a deficiency in auditory ability (cf. phonemic coding ability) only.

This view of aptitude did not generate much research after the late 1960s, perhaps partly because it was the unfortunate selectional monolithic potential of aptitude that received greatest prominence outside the research community, and because the conception of aptitude proposed was associated with the audiolingual methodology and not thought to be appropriate to more communicative teaching or to a more acquisition-oriented approach to language development (Krashen, 1981). Some research has continued to be done, although it has not really challenged the original formulations but merely modified them or extended the range of situations in which aptitude tests might be used. Green (1975), for example, developed an analytic apti-

tude test for use with British schoolchildren. Petersen and Al-Haik (1976) produced a new battery of aptitude tests that stressed auditory and analytic capacities for use with American Military Personnel (the Defense Language Aptitude Battery, or DLAB; Petersen and Al-Haik, 1976). They hoped that by making the test more difficult, they would overcome limitations of previous batteries such as the MLAT, which failed to discriminate effectively at the top end of the ability range (an issue of some importance when any subject selection is involved). However, the DLAB yielded predictive coefficients only marginally higher than the MLAT, and, since the theory underlying the DLAB is much less clear than that of the MLAT, one cannot say that the advance here was any more than technical. Skehan (1980, 1982) investigated the role of memory and showed that developments in cognitive psychology are important for the memory component of language aptitude. The associative memory thrust of the MLAT now appears overly restrictive, with a need also to consider memory organization as well as the capacity to integrate unfamiliar words to enable them to operate as functional units.

Skehan (1986c, 1988) also investigated the origin of language aptitude. He was able to give aptitude tests to the children whose first language development had been monitored as part of the Bristol Language Project (Wells, 1985) some 10 to 12 years earlier. In this way, connections could be made between *rate* of first language development (from data obtained when the children were 3 to 5 years of age) and scores on foreign language aptitude tests (obtained when these same children were 13). It was shown that significant correlations (as high as 0.50) could be found between these two sets of measures. Interestingly, the highest correlations were between first language measures of auxiliary and pronominal development and analytic aspects of foreign language aptitude. These features of first language development have been termed "fragile syntax" (Long, personal communication, 1987; Goldin-Meadow, 1982). Other aspects of first language development (e.g., the development of the modal system, or Mean Morpheme Length of Utterance) did not correlate as highly with subsequent aptitude.

The results do, therefore, go some way toward demonstrating that aptitude for foreign languages is, to some extent, a residue of first language learning ability (Carroll, 1973). Some approaches to language (e.g., Chomsky, 1981) emphasize the universality of language learning and the lack of individual differences within a homogeneous speech community. This follow-up research to the Bristol Language Project (which itself demonstrated wide individual differences in rate of first language development; Wells, 1986) indicates that for foreign language learning aptitude, one needs to take into account ways in which individual learners differ. The implication is that the search for universal processes in SLA needs to take account of learner-to-learner variation, since different learner attributes may have different consequences for the nature of language development.

When first language development was related to foreign language aptitude *and also* to foreign language achievement, another aspect of the results was revealed. An ability to handle decontextualized language was also evident from the original first language research (Wells, 1985) and this, when operationalized through various test-based and lexical development measures of first language, had significant relation-

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ships with the aptitude measures and the foreign language achievement measures (Skehan, 1988). Regression analyses demonstrated that the linguistic first language measures (auxiliary development and pronominalization particularly) and the early decontextualization measures (lexical development, etc.) combined to give more effective prediction of foreign language aptitude and foreign language achievement measures (Skehan, 1988). Skehan (1986b, 1989b) proposed that aptitude measures are partly based on underlying language-learning abilities (cf. the four-factor model) and partly on decontextualization abilities (the capacity to deal with context-disembedded language, e.g., the tests' multiple-choice format and necessarily abstract material). Aptitude tests, then, achieve their predictive power because achievement, certainly in conventional classrooms, is based on both language capacities and decontextualization abilities, with these latter functioning as a sort of educational adjustment factor (Skehan, 1986c).

The previous studies have all aimed at identifying the components of language aptitude and have tacitly assumed that these components aggregate in cumulative fashion to influence language-learning success. In contrast, Skehan (1986a) investigated whether success can be achieved by different routes, and by using the technique of cluster analysis (see Everitt, 1978), was able to find evidence for the existence of different profiles of language aptitude. Some learners seem to have a linguistic orientation to learning; that is, achieving success by considering language learning to be a pattern-making problem, with rules and analysis figuring prominently. Others are more memory-dependent and see language less as a system whose rule-based nature can be exploited than as an "accumulation of chunks," where these chunks or prefabricated elements provide communicative potential directly. This contrast relates to developments in linguistics, first language acquisition, and applied linguistics that suggest that the "analyst's model" of the organization of language need not correspond with a "user's model," where language must be processed in real time (Pawley & Syder, 1983), or with a "learner's model" (Peters, 1983), which accounts for language acquisition. Skehan (1989a) proposed that there are analytic foreign language learners and memory-oriented learners. Success is achievable for each type of learner provided that learners play to their strengths. Research by Wesche (1981), for example, indicated how matching students with methodologies on the basis of aptitude test information can lead to greater student satisfaction and success, while mismatching can lead to the reverse. The major implication here is that not only do we need to consider the importance of individual differences, but we also need to examine whether "learner types" exist (i.e., predispositions to process language according to aptitude profile characteristics). The cluster analysis research reported earlier (Skehan, 1986a) suggested that IDs are not simply continuous; that is, more or less memory, or more or less analytic learning capacity; but that there may be style preferences, with some learners preferring to treat language learning as an analytic task while others regard it as a problem for memory. Further research is needed in this area to clarify these issues, not least because there are instructional implications—how do teachers and coursebook writers make provisions for the strengths and weaknesses of each learning type?

Given the rather slender achievements in the field of aptitude research in recent

years and the omissions in what has been investigated, three comments need to be made in relation to future developments. The first is that there is considerable scope for research that revises current conceptions of aptitude. The components of the four-factor model still seem viable. However, each of them could benefit from revision to take account of developments in other disciplines. One would like to see attempts to probe the nature of an analytic ability more explicitly in terms of current linguistic theory (e.g., White, 1989) or putative SLA processes, such as transfer or generalization, to see whether such a basis for generating aptitude test items would be more predictive. Similarly, developments in cognitive psychology, memory, or speech perception might generate new aptitude tests that would be more effective (McLaughlin, 1990). Second, one would also like to see tests developed that have a wider view of what is involved in language learning and language performance (Spolsky, 1989). These might simply target components in emerging models of communicative competence and communicative performance (Bachman, 1990) that go beyond simple linguistic competence, and include, for example, textual competence, sociolinguistic competence, illocutionary competence, and even strategic competence. They might also include the capacity to handle some skill areas better than others, for example, listening compared to reading. There is also scope to develop tests that link with theoretical models of performance such as that of Bialystok (1990). Such research could explore whether aptitude has a psycholinguistic foundation. This, in turn, would imply that criterion measures that are used to evaluate performance should be differentiated so as to provide appropriate criteria for the extended range of potential predictor tests that would be involved. Finally, it is important that aptitude research be conducted in a variety of learning contexts. It has been argued (Skehan, 1986b) that the components of the four-factor model are relevant for informal as well as formal learning environments, despite claims to the contrary (Krashen, 1981). However, most research has been conducted in conventional class-based learning settings (see Reves, 1983, for an exception). There is a need for research that takes a wider perspective and that investigates whether (and how) IDs are relevant to informal language-learning settings as well. Such research might also look at aptitude-achievement relationships at different proficiency levels: Spolsky (1989) argued that aptitude, as currently conceived, is more applicable to the early stages of learning. Such an emphasis implies well-organized studies to separate out the effects of formality and proficiency level since these often go together (i.e., formal learning is more likely at lower proficiency levels).

MOTIVATION

It was interesting to note that two reviews of motivation published in 1989 (Crookes & Schmidt, 1989; and Skehan, 1989a) independently came to the same general conclusion. The work of Robert Gardner has been of considerable importance in the field of motivation (both for his findings and the methodological standards he has set), but the conception of motivation involved is limited compared to the range of possible influences that exist.

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Table 1. Influences on motivation

	Within the Learning Context	The Results of Learning
Outside the individual	Materials Teaching	Constraints Rewards
Inside the individual	Expectations Success	Goals

to organize the different influences of motivation. The 2×2 table contrasts the dimensions of the learning relationship (within the learning context vs. the results of learning) with the relationship to the individual (inside vs. outside). Four "cells" are accordingly generated. Materials/teaching embraces those influences on the motivation of students that are the consequence of the instructional context. One can speculate here about influences such as attractiveness of teaching materials, amount of variety in classroom work, the nature of classroom organization (e.g., lockstep vs. groupwork), the nature of teacher-student relationships, and so forth. One assumes that different approaches to teaching may have different impacts on the motivation of students. Constraints and rewards concern those consequences of learning that are manipulated by others (e.g., educational agencies, employers, parents). Frequent class tests, public examinations, monetary reward, and threats of being cut from the class all fall into this category, representing the "carrot and stick" approach to manipulating other people's motivations.

The lower row of the matrix, in contrast, is concerned with psychological influences within the individual. Within the learning context, expectations and success concern the way motivation may be caused by the satisfaction of doing well, and also the anticipated satisfaction that one will do well (Crookes & Schmidt, 1989). Here, the proposal is that motivation does not cause success, but simply follows it. Finally, the goals cell reflects those attitudes and beliefs within the individual that cause action and effort. They consist of fairly stable beliefs that lead to the individual wanting to achieve certain goals because they have positive value in his or her worldview.

The major point to make about the study of motivation in language learning is that the emphasis has been excessively on the study of goals. There has been relatively little research into the effects of different materials and teaching techniques on the motivation of students (although all manner of generalizations in this area are conveyed during teacher training courses). Nor has there been much research into the effects of manipulating constraints and rewards. There has been some research into the effects of success on motivation: some (e.g., Burstall, 1975; Hermann, 1980) claim that success precedes and causes motivation, while others (Gardner, 1985) contend that motivation is primary.

As a result of this unusual concentration of research effort, the major part of this review of motivation will focus on the research into motivational goals. Much of this work has been conducted by Robert Gardner at the University of Western Ontario.

Gardner (Gardner, 1979, 1985; and Gardner & Lambert, 1972) proposed that motivation is strongly influenced by two orientations to language learning. An integrative orientation is typical of someone who identifies with and values the target language and community and who approaches language study with the intention of entering that community. Such an individual is thought to have an internal, more enduring motivation for language study and is therefore more likely to make the cumulative effort that is necessary to achieve language-learning success and, in addition, may be less likely to withdraw from language study (Ramage, 1990). One might also expect an integrative orientation to be more salient at higher proficiency levels (Dornyei, 1990). Instrumentally motivated learners, on the other hand, are more likely to see language learning as enabling them to do useful things, but as having no special significance in itself, or as depending on valuing the speakers of the language concerned. Instrumentally motivated learners, therefore, will be motivated if they see language-learning capacity as having beneficial career prospects, for example, or as enabling them to study in the foreign language or simply to use transactional language while they are having to deal with speakers of the language concerned. (Instrumental learners, that is, are more dependent on the constraints, rewards cell of the matrix in Table 1.)

Gardner (1985) operationalized motivation and motivational orientation by means of the Attitude and Motivation Index (AMI), a self-report schedule in which learners respond to Likert-style items on various aspects of motivational orientation; attitudes to their teacher, to speakers of the language, and so forth; motivational intensity; and anxiety (Gardner, Clément, Smythe, & Smythe, 1979). Drawing on extensive research with high school children in Canada, Gardner reported correlations between the AMI and measures of language-learning achievement at around 0.30 to 0.46, indicating a consistent and important, but moderate, relationship. Measures of aptitude correlated at similar levels with these subject groups, allowing Gardner to demonstrate that multiple correlations (relating aptitude and AMI scores, on the one hand, to achievement, on the other) were in the range of 0.40 to 0.65. These underlay Gardner's two-factor account of language learning success. (See Au [1988], for discussion of this, and the debate between Au [1988] and Gardner [1988] on just how robust these correlational levels are.)

More recently, Gardner (1985) extended his approach in two ways. First, he explored the relationship between learning situation and the influence of motivation, and second, he examined the value of causal modeling techniques. As regards learning situation, he proposed that one must distinguish between formal and informal learning situations, and that aptitude only influences the former directly, while motivation influences both (and so must be considered to have greater explanatory power). With respect to causal modeling, Gardner explored the use of a technique that seems to offer a mathematical sophistication to match the complexity of the range of independent and dependent variables involved. Causal modeling, and in particular, the Linear Structural Relations technique (LISREL), enables the investigator to specify the nature of the relationship between variables and then test for how well the data obtained fits the complex model that has been specified. Gardner (1985, pp. 156-166) categorized the influences on achievement as aptitude and motivation

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(which are predicted to be independent of one another), with motivation itself being influenced by Attitude towards Learning Situation and Integrativeness. Each of these variables is then operationalized, and patterns of relationships are examined. The predictions from the model are then assessed, not simply in terms of the direct relationships (Motivation and Aptitude on Achievement), but also the indirect relationships (e.g., Integrativeness and Attitude towards Learning Situation influencing Motivation, which then influences Achievement). The proposed model is then seen to account for the data adequately when judged by "goodness-of-fit" tests.

Gardner's work has been immensely important, both methodologically and in terms of content, and it has clarified considerably the nature of motivational orientation and appropriate measurement and statistical techniques. It has, however, not gone without criticism. Oller (1977, 1981), for example, attacked Gardner's methods of measuring motivation. The ensuing debate has usefully clarified many measurement concepts, and Gardner (1980) argued that some of the criticism (drawing on conflicting results from a number of studies: Chihara & Oller, 1978; Oller, Baca, & Vigil, 1977; Oller, Hudson, & Liu, 1977) can be explained because unvalidated and single-item measures were being used by his critics when they should not have been. Gardner (1985) and Skehan (1989a) pointed out errors in Oller's logic in claiming that motivation scales achieve their levels of correlation because they measure things other than motivation, (e.g., self-flattery and intelligence), and that it is these that correlate with achievement. Gardner (1980) also discussed profitably what frame of reference we should use in assessing strength of relationship as measured by correlation coefficients in language learning, where many causal influences interact. On balance, one can say that Gardner resisted effectively the methodological criticisms that Oller made, and that the methods of scale construction that he used (influenced, as he is, by research methods within social psychology) set a standard for the use of self-report measures of this kind in language acquisition research. He reported extensive reliability figures for the scales that he developed and also researched their validity, using traditional factor analytic techniques, more sophisticated causal modeling approaches, and also multi-trait, multi-method designs. One can be less certain about the causative role of motivation. Gardner (1985) reported an absence of the influence of success on motivation, while Strong (1984), Hermann (1980), Burstall (1975), and Au (1988) claimed the opposite. These various studies are not strictly comparable in methodology, statistical technique, or subject selection. The result is that further research is necessary to resolve the issue. The current situation is reasonably consistent with the unsurprising conclusion that both claims are partly true—motivation both causes, and is caused by, success (Skehan, 1989a).

A serious criticism of Gardner's work within its own terms comes from the relationship between orientation, motivation, and context of learning. In earlier research (Gardner & Lambert, 1972), there was a tendency for the integrative-instrumental distinction to increase in importance the closer the research was to Montreal (the starting point for the original research). As one moved away, the distinction was less clearly defined, (e.g., in Maine, Connecticut, and in the Philippines, an instrumental motivation seemed to be more important). Lukmani (1972), in an Indian context, also found an instrumental orientation to be more effective. Research by Gardner during

the 1970s often did not illuminate this issue since the AMI became a fairly composite measure, drawing on a whole range of potential predictive aspects of motivation in a rather eclectic way (Au, 1988; Crookes & Schmidt, 1989). As a result, it does not give any clear indication of the relationship between different orientations and different learning situations, although Gardner (1988) disputed Au's claim that this variation is not systematic.

In fact, research by Clément and co-workers (Clément, 1986; Clément & Kruidenier, 1985; Kruidenier & Clément, 1986) showed that (a) there are more orientations to consider than Gardner's original two, and (b) the connection between these additional orientations and the learning situation is complex. First of all, Kruidenier and Clément (1986) identified, on the basis of research conducted in Quebec, four major orientations: instrumental; friendship; travel; and knowledge or understanding. They linked these orientations to particular contextual factors. They investigated this (Kruidenier & Clément, 1986) by using a research design that contrasted sub-groups of learners who varied in ethnolinguistic group (anglophone vs. francophone), socio-political status of the target language (official French vs. English vs. minority Spanish) and cultural setting (unicultural vs. multicultural).

In their research, Kruidenier and Clément (1986) reported that a friendship orientation had its greatest impact on the motivation levels of francophones, while anglophones were more influenced by a knowledge orientation. A travel orientation was more important for students learning a minority language (e.g., Spanish), while learners of languages that had an official status in the country concerned (e.g., French learners of English) were influenced by an instrumental orientation. (Other orientations were also discovered by these researchers but did not seem to have much general applicability.) Interestingly, Kruidenier and Clément (1986) did not find direct evidence for Gardner's integrative orientation. One has to wonder whether it is the more fine-grained approach to identifying different contexts that caused the integrative orientation to "decompose" into constituent parts of friendship, travel, and knowledge, or whether an integrative orientation simply was not relevant in their study. Dornyei (1990), however, argued that an integrative orientation may subsume the different orientations found by Kruidenier and Clément (1986) and also by Dornyei (1990) himself.

We can sum up research on motivation, therefore, by saying that considerable progress has been made, but that greater scope for research remains. Within the paradigm of inquiry established by Gardner it is clear that motivation has a causal influence on language-learning success, but that the original distinction between integrative and instrumental motivations is lacking in universal relevance. The most pressing difficulty facing such researchers seems to be one of clarifying the orientation-context links that exist. There would seem to be a wider range of orientations here than was previously supposed, and there is considerable scope to investigate different contextual circumstances (outside Canada!) by varying the L1-L2 learning relationship in different ways. Only through such research will we obtain a better view of the domain of applicability of different orientations as well as receive guidance concerning the findings that a more general model will have to account for.

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tion implied in Table 1. Currently, we are in no position to assess the *relative* importance of goal-linked motivation because other sources of motivation have been largely ignored when goal-based studies have been conducted. In terms of content, there needs to be inclusion of the classroom events and materials and the general educational reward framework. There also needs to be greater attention paid to the effects of success and student expectations on motivational levels (Crookes & Schmidt, 1989). In turn, the incorporation of this more extensive framework implies greater complexity of research design and methodology. It will be important to set up studies so that interesting comparisons are possible, contrasting the impact, for instance, of different types of materials with that of different orientations. It may also be necessary to use a different range of data elicitation procedures (Crookes & Schmidt, 1989). So far, the emphasis has been on self-report measures administered once during a course of study. We need a more longitudinal approach in which motivational levels are monitored so that we have a clear view of how different motivational influences change in operation over time. It may also be necessary to go beyond questionnaires, which are necessarily constrained by the agenda as seen by the researcher. More open-ended and ethnographic techniques may need to be used to address such issues as reactions to methodologies used, satisfaction with materials, or the basis for expectations about student success. Emerging evidence indicates that students can articulate their reactions to what goes on in classrooms (Nunan, 1988), and what sort of activity they perceive language learning to be (Horwitz, 1987). A wider range of techniques, therefore, seems indicated. It would also be valuable to use classroom observation devices to obtain more objective and reliable data on classroom events to see whether these can be related to motivational patterns. This might go some way toward responding to Crookes and Schmidt's (1989) call for a more "real-world" impact of motivational studies, connecting with the *actions* of learners, such as the choices they make, the persistence they show, and their activity level, and not simply their responses to questionnaire items. More ambitiously, it would be valuable to link motivational levels to processes and mechanisms of learning (Crookes & Schmidt, 1989). Spolsky (1989), for example, suggested that positive attitudes work because they lead students into more learning and interactional opportunities. There may even be scope to modify various aspects of the classroom (e.g., syllabus, activity mode) to try and generate experimental effects.

LEARNER STRATEGIES

Looking at aptitude and motivation, this article has tended to focus on research done by small groups of people. Research on learning strategies, in contrast, has gone through a near-explosion of activity in recent years, with several different groups now active in this area.

Researchers in the 1970s explored techniques of gathering data from learners to enable a profile of good language learner behaviors to be identified, and then perhaps used as the basis for training less effective learners. Naiman, Fröhlich, Stern, and Todesco (1978) used semi-structured interview techniques to induce very successful

learners to reflect on their previous learning experiences. They identified five general strategies in this way:

1. an active task approach;
2. a realization that language is a system;
3. a realization that language is for communication;
4. the capacity to handle the affective difficulties in language learning; and
5. the capacity to monitor one's own progress.

Other investigators (e.g., Rubin, 1981) proposed related lists of learning strategies, in Rubin's case emphasizing more the *processes* of learning, including deduction, practicing, inferencing, and so forth. Rubin (1981) also introduced the distinction between direct and indirect strategies, with the former being immediately involved in learning (e.g., inferencing) and the latter being more concerned with preparing the learner to exploit learning experiences more effectively later (e.g., in practicing).

During the 1980s, work on strategies continued, but changed in character. Politzer and McGroarty (1985) attempted to devise questionnaires (based on the previous learner strategy research) that tried to assess how much individual learners were using particular strategies, in, for example, classrooms, self-study, and interaction. They discovered very little relationship between these questionnaire-based measures and subsequent language-learning success. This "non-finding," although very much in need of replication with other groups of learners, suggests that translating the insights from earlier strategy research into questionnaire construction is not a straightforward undertaking. O'Malley, Chamot, Stewner-Manzares, Kupper, and Russo (1985a), in contrast, continued to use less structured data collection techniques. In one study they discovered that group interviews with ESL high school students were the most effective technique, generating far more strategies than they had expected to find. O'Malley et al. (1985a) categorized these strategies into three main sorts—metacognitive, cognitive, and social. They found that the most frequently occurring strategies were the ones that required only superficial processing of material, for example, repetition; while more demanding strategies, for example, inference and elaboration, were used less often. O'Malley, Chamot, Stewner-Manzares, Kupper, and Russo (1985b) also investigated the trainability of strategies, reporting marginal gains as a result of short-term training.

In the last few years there have been extensive and impressive attempts to examine the application of strategy training. Ellis and Sinclair (1989) published a training course for learners of English that attempts to make accessible and relevant for classroom teachers the training techniques that may be used. Oxford (1989) similarly provided a guidebook for teachers interested in strategy applications. She classified strategies as indirect and direct (cf. Rubin, 1981). Within the direct strategies, she included memory, cognitive, and compensatory (cf. communication) strategies, while indirect strategies are metacognitive, affective, and social. Each of these major strategy headings is subdivided extensively, and guidance is given as to how the strategies might be developed in learners. Oxford (1989) also provided techniques for gathering information on learner strategies (using the Strategy Inventory for Language Learning, or SILL), and reported considerable enthusiasm on the part of learners when

strategy training is used. O'Malley and Chamot (1990) also dealt at length with applications of learner strategies and indicated how strategy training may be integrated within a content-oriented curriculum.

Currently, several issues are active within the learner strategies literature, and their resolution would have considerable promise for the way languages are taught. There are two fundamental issues that need to be considered at the outset. First, there is the issue of the theoretical basis for learning strategies. The most relevant work here is that of O'Malley and Chamot (1990), who tried to ground strategy research within the cognitive theory of John Anderson (1985), and demonstrate how the concepts of cognitive psychology provide a framework within which learning strategies operate to transform the manner in which material is processed and learned. (The approach assumes that learning a language is the same as learning content, and therefore does not have much of a role for any specifically linguistic faculty, hence conflicting with UG approaches or any other approach that proposes separate mechanisms for the handling of linguistic data.) Second, there is the issue of the classification of strategies. At present, investigators are hardly past the stage at which they trawl for strategies using a variety of data-gathering devices (e.g., group interviews, retrospection, diary studies, questionnaires, etc.) on a rather ad-hoc basis. The results of such work are then categorized as systematically as possible. The current situation (which also draws on non-language strategy research; Brown, Bransford, Ferrara, & Campione, 1983) manifests a fair amount of agreement, with the proposed classification not needing to be modified drastically as additional studies accumulate (O'Malley & Chamot, 1990). The two major schemes are those of O'Malley and Chamot (1990), who discussed metacognitive, cognitive, and social strategies, and Oxford (1989), who discussed the six global strategies (three direct and three indirect) mentioned earlier. The degree of overlap between the two schemes is considerable. Oxford's cognitive and memory strategies are easily located within O'Malley and Chamot's cognitive category, just as her social and affective strategies seem an extension of the O'Malley and Chamot social category. In this view, the major addition in the Oxford scheme is the compensation category. However, the most important point here is that there is a need to go beyond the convenient classifications that we now have and make links between these schemes and underlying theory. The O'Malley and Chamot (1990) research is an important step in this direction.

There are also a number of more practical concerns in learner strategy research. A basic question concerns how training can be most effectively accomplished, an issue of some importance. Several lines of inquiry are being pursued, such as whether the instruction in strategies is integrated with a regular coursebook or is separate; whether students are informed of the purposes of training or not; and whether there are benefits in using language strategy training linked to content courses (O'Malley & Chamot, 1990). Currently, despite the enormous energies and talent that have gone into developing strategy training materials, there has been relatively little evidence of a gain-score nature to indicate the effectiveness of such training. While there may be many reports of satisfied customers (who clearly feel that the guidance provided is helpful) actual experimental results are not so impressive, and do not compare favor-

ably with those obtained outside the language-learning context. There is a lot to play for here, as little systematic work has been done to (a) identify which strategies or strategy categories are most susceptible to training (hence, the importance of the more fundamental issues discussed later), (b) investigate what lengths of training time are needed to achieve significant and enduring results, (c) discover what types of presentation techniques are most effective, and (d) discover whether all learners are equally influenceable by strategy training. Research of this nature will be required in order to establish that there are consequences in using learner training, rather than simply providing more activities for teachers and learners to engage in. There is still the worrying possibility that good learners are ones for whom the use of effective strategies are possible, while for poorer learners they are not. The issues are all the more pressing since moves toward learner autonomy and process syllabuses presupposes learners who are more able to achieve independence in their language-learning efforts; unless we can deliver techniques to enable learners to handle such autonomy, such syllabuses may not be usable except by a few unusual students.

We also need to know more about the typical strategies used by good language learners. The early research has already been mentioned (i.e., the work of Naiman et al., 1978; and Rubin, 1981). To this may be added the finding that the more superficial strategies are more frequently used. Further research by Chamot and Kupper (1989) suggested that what may distinguish good and bad learners is not so much the number of strategies employed as the flexibility and appropriateness with which strategies are used. All learners use strategies: what good learners do is to choose the right strategy for the right occasion. If so, what training should be given may need to be aimed more at improving the decision-making capacities of learners. There is, however, increasing evidence that metacognitive strategies are not used as much as they might be. Monitoring and evaluating one's own performance seems the least popular of this important class of strategies and so might be the clearest challenge facing strategy trainers.

LEARNER STYLES

The concept of learning style does not suggest a concern for individual or restricted variables, but rather a general predisposition, voluntary or not, toward processing information in a particular way. Until recently, the emphasis in learning style research was simply on the difference between field dependent (FD) and field independent (FI) learners. Although discussions of the FD-FI contrast suggest that each extreme has its advantages (FD learners are more person-oriented, and should do better with interaction-based learning; FI learners are more analytic and object-oriented, and learn more effectively when confronted with a body of material to be assimilated), most actual studies have found results in favor of FI learning. A number of researchers reported relationships at around the 0.30 level. However, these findings had to be qualified since, when the effects of intelligence were partialled out of the correlations concerned (IQ being a well-established correlate of field independence), the relationship was reduced to only a marginal significance (Hansen, 1984; Hansen & Stansfield, 1981).

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More recently, the studies of learning style have gone beyond the simple FI-FD distinction (Spolsky, 1989). Reid (1987) gathered data on perceptual learning styles showing that many learners have distinct preferences for auditory, visual, or kinesthetically presented material. Willing (1987) conducted intensive research in this area. He used two dimensions to characterize learner style. The first of these is the familiar one of field independence-dependence. The second is an active-passive dimension. Taking both dimensions together defines four quadrants. Field independent-active learners are characterized by Willing as being communicative in orientation toward language learning. Field independent-passive learners are seen as having an analytic, detached learning style. The field dependent-active combination is associated with a "concrete" learning style, while the field dependent-passive learners are characterized as having an authority orientation. These four different learner types accounted for 40%, 10%, 10%, and 30%, respectively, of Willing's population of learners within the Australian Migrant Education Service. Willing used questionnaire-based data and factor analytic techniques to identify these learner types. Assuming the validity of this procedure, the defining items for the scales that characterized the different learning styles imply radically different classroom orientations and activity preferences for different types of learners. What Willing did was to identify possible learner types based on modes of processing information and classroom response. Further research is needed to establish what the consequences are when learners of different types are placed in appropriately and inappropriately organized classrooms.

There are also possible links to be explored between aptitude and learner styles. The aptitude research has suggested that there may be analytic and memory dependent learner types (with perceptual type a third, relatively unexplored possibility), with these types characterized by aptitude score performance and with *either* type being a viable route toward success. The learner style research draws heavily upon a field independence-dependence opposition (with Willing's active vs. passive dimension, following Kolb [1976], being more of a personality trait). Clearly there is scope for exploring the connection between the analytic learner type from aptitude research and the field independent learner type from the learner style research. Are these essentially two labels for the same basic style or predisposition in processing information?

One aspect of the problem that may be relevant here is what contrasts are being made. In learner style work, the opposite of field independence is field dependence (i.e., the less one is field independent, the more one is, necessarily, field dependent). In aptitude work, on the other hand, the opposite of an analytic capacity is the lack of an analytic capacity, rather than a contrasting style of processing information such as field dependence. Further, the contrasting style, a memory orientation, is seen as independent of an analytic orientation. In other words, it is possible *simultaneously* to be high on analysis *and* high in memory capacity and so to be a doubly blessed learner. Similarly, one could be low in both, or a combination of higher in one and lower in the other. Two points are being made here. First, there is a correspondence between the aptitude research and the learner style research that deserves further work. Second, the aptitude research suggests two dimensions, where the styles research assumes only one. According to the aptitude version, the opposite of being an

analytic learner is *not* to use an analytic orientation, which does not have any implications for the memory orientation one has. This contrasts with the styles viewpoint, which suggests that the less one is analytic and field independent, the more one has to be field dependent in learning style. Further research is needed.

ID RESEARCH: CONCEPTUAL ISSUES

The foundation of ID research is that it examines attributes on which learners vary and how such variations relate to language-learning success. Four consequences follow from this fundamental approach. First, it encourages quantification of the strength of relationship between any particular ID (e.g., aptitude) and language achievement. As a result, it is possible to decide whether the relationship concerned is trivial, moderate, or even strong. Following from such research with individual variables, when *different* ID-achievement relationships are investigated, they may then be compared, so that some appreciation of their *relative* importance can be reached and an assessment made of the impact of each variable on language-learning success (cf. Gardner's comparisons of aptitude and motivation). This approach does not come so naturally to more experimental approaches, which are more likely to demonstrate *statistically* significant differences between two treatment groups (say) without being able to assess very easily whether any difference that is found is *practically* significant. It is possible that UG findings are of this sort—differences are found when studies are run, but it is another thing entirely to show that the UG features investigated actually have relevance for general language learning. Correlations between ID variables such as aptitude and motivation and language-learning success, when they exceed, say 0.40, indicate not simply a statistically significant relationship, but also one that is important in terms of *strength* of influence.

A pursuit of quantification also has the advantage that it encourages good operationalization and measurement, on the one hand, and a search for robustness, on the other. The former is important because ID investigators will need to develop effective measures of the traits and constructs that they are researching. This will cause pressures to establish reliability and validity effectively. The research into the measurement of motivation is a case in point. The latter, a concern with robustness, has importance because quantification, in itself, is not enough. It is also important to probe how consistently a particular relationship is found, as the context of learning (e.g., formal vs. informal) changes. That is, one wants to know the limits on the operation of a particular ID-achievement relationship and when it is and is not likely to emerge. Again, motivation provides a clear example, with the debate between Au (1988) and Gardner (1988) on how consistent the correlations are between motivation and achievement being very instructive on how robustness is established.

Second, by examining the range of influences on second language achievement, interesting points of contact between different single IDs may be revealed. One interesting convergence of this sort, that between aptitude and learner types, was examined in the previous section on learning styles. A second example concerns the roles of decontextualized learning and metacognition (Donaldson, 1978; Tizard & Hughes, 1984). Aptitude research has suggested that, in addition to specific compo-

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ments of the four-factor model, aptitude sub-tests also tap a decontextualized learning skill (Skehan, 1986c, 1988) and that this is an important determinant of language-learning success, even in these days of a more communicative orientation to language teaching. Learner strategy researchers have also demonstrated the importance of metacognitive learning strategies (O'Malley & Chamot, 1990), that is, strategies that have a planning, directing, or monitoring role and that require the learner to stand back from the direct learning and consider how the direct learning itself can best be managed. Quite clearly, there are similarities between a decontextualized learning ability and metacognitive strategies. Each seems to involve the learner analyzing and assessing the learning situation and then reacting accordingly. The aptitude research tends to focus on the educational and social antecedents of this decontextualized learning ability, while the strategy research emphasizes the analyzability and trainability of this class of strategies. The situation seems ripe for some cross-fertilization with the research in each of these areas.

The third advantage of having an ID perspective on research is that it encourages the development of more formal models that relate IDs to one another and to language acquisition. The work of researchers such as Carroll (1965), Gardner (1985), and Spolsky (1989) exemplified this. Such models go beyond simple prediction and achieve explanatory power. They were not simply concerned with the establishment of simple relationships, but had some degree of theoretical status, since they are testable for the predictions that they make and may be taken to be representative of reality. But most interestingly of all, a move toward formal models could be the basis for condition-seeking or experimental manipulations that investigate the operation of IDs in different contexts of language learning. The discussion of analytic versus memory dependent learning styles is an example of this, as would be the related distinction between field independent and field dependent learners. The research by Wesche (1981) would clearly fall within this framework, too, as would research by Nation and McLaughlin (1986) and Wong-Fillmore and Valadez (1986), both discussed more extensively in Skehan (1989a). Such research will build bridges between a focus on particular IDs that can characterize learner performance and the more manipulative and process-oriented research that is more typical of second language acquisition studies. It is such interaction-based research that is necessary to address the complexity of human language learning and for which different statistical techniques are required.

The fourth advantage of an ID framework connects with the complexity of language learning and also its multi-causal nature. Investigators have responded to this complexity in one of two ways. A theory-then-research perspective (Larsen-Freeman & Long, 1991; McLaughlin, 1987) makes deductions from an initial set of axioms and then subjects these to test. Its reliance on theory allows the researcher to focus on some types of data or situations because of their crucial role in the theory. This "valuing" of certain data enables other areas to be ignored on the assumption that they are not relevant to the problem at hand (Larsen-Freeman & Long, 1991). A theory-then-research approach saves the researcher from having to investigate everything and enables a focus on what is deemed to be important and revealing. The risk, of course, is that factors that are actually important may be devalued and

ignored because they do not fit into a researcher's theoretical framework. The alternative, research-then-theory, approach is less prescriptive, tending to encourage widespread data collection and the establishment of generalizations. It is the basis for much of the ID work that has been done. However, it is much less guiding in nature, with the danger that the investigator may be swamped with data (Skehan 1989a).

Skehan (1989a) suggested that a beneficial compromise between these two contrasting poles occurs when a general framework exists into which particular studies can fit. Examples exist in Spolsky (1989), Carroll (1965), and Skehan (1989a). Each of these provides a framework or taxonomy within which future research can be located. The framework provided by Skehan (1989a) is essentially no more than a taxonomy, but it has the advantage that it constitutes a shell into which it is possible to fit individual research studies. The framework allows the researcher to see, simultaneously, both the large picture and the small picture. In this way, a particular variable may be focused on, for example, motivation, and the results obtained used to deepen knowledge in that particular area. However, the existence of the larger framework would allow connections to be made and the relationship of individual studies to the wider framework to be explored (e.g., motivation linked to different aptitude in students or to different types of classroom organization [Crookes & Schmidt, 1989] or even different types of learning processes). Only such a dual perspective, between the macro and the micro, will maximize the chances that cumulative progress is made and isolated, unintegratable studies avoided, whether these are of an experimental nature or of a more ID orientation (Skehan, 1989a, Ch. 8).

ID RESEARCH: METHODOLOGICAL ISSUES

The basic tools of the ID researcher have tended to be scale or test construction; a concern with the reliability and validity of the scales that have been constructed; and finally, an examination of bivariate and multivariate measures of the independent (predicting) variables and the dependent (predicted) variables. Most of the aptitude and motivation research falls within this paradigm, as do the range of studies into other IDs such as personality, risk-taking, anxiety, and so forth. The basic problems concern how to handle multiple measures of related constructs and how to account for a phenomenon, language learning, which is multi-causal. Undoubtedly, this basic paradigm will continue to be used, as its fertility is far from exhausted. It will not be commented on here, however, since it is fairly well known as an approach and has been described elsewhere (Skehan, 1989a). Instead, this section will examine two main issues that are less well known in ID research: the study of the individual, and the nature of hypothesis testing.

As regards the study of the individual, there is a continuum of how much attention is given to the individuality of the learner. At the simplest level, we have seen in some of the research described earlier that different statistical and data collection methods are now being used. Regression and factor analyses, the staple techniques of ID research, basically assume that the different variables that are included make additive contributions to language learning success. However, it is possible that there are alternative routes to success that do not simply consist of the cumulative influence of

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a group of variables. It may be that alternative and compensatory abilities exist such that two people may draw upon very different abilities to reach a similar level of proficiency in a language. It may be necessary to use techniques such as cluster analysis more frequently to investigate this possibility. The example was given earlier of memory and linguistic orientations to aptitude providing alternative ways of moving toward success (Skehan 1986a). Cluster analysis is more likely to reveal configurations of ability that enable the individual to perform in a certain way. This takes us closer to being able to identify relatively discrete "learner types" that suggest the *dynamic* of how language is being acquired and used rather than simply predicting performance on the basis of the cumulative contributions of a number of relevant variables.

However, it could also be argued that even such learner type research does not do justice to real individuality and that an even more uncompromising research-then-theory perspective is needed. After all, investigators specify the scales and tests that they use as operationalizations of underlying constructs, and although they enable more diversity to reveal itself, there is still the issue that the scales and tests constrain how widely the data obtained can range. We have also seen that in an area like language strategy research, less restrictive data collection methods are used. Interviews are used that are not completely structured, and introspection is encouraged. The onus is much more on the subject to generate the data *in his or her own terms*. (See the discussion of data collection methods for strategy research in O'Malley and Chamot, 1990, Ch. 4.) There was also the suggestion in the section on motivation that a wider range of data elicitation techniques should be used to tap different motivational sources. Basically, ID research seems to be moving toward a greater reliance on ethnographic approaches. These would allow such research to capture the individuality of the learner more fairly, rather than simply to categorize him or her more finely. It might place the individual firmly in center stage and accept the uniqueness of each individual learner, following whatever categories or constructs are necessary for that learner and in whatever patterns. This implies that the attempt to identify basic categories of variation is misleading and distorting of reality from the perspective of any particular individual.

In fact, the basic issue is not a new one at all and has preoccupied psychologists (Allport, 1937) for some time, under the labels of idiographic (i.e., the individual can only be understood as an individual, without the straightjacket of other people's categories) and nomothetic (i.e., it is most revealing to study individuals through constant categories that apply to everyone). The ID research advocated and described in this article is largely of the nomothetic sort, as this reflects the sort of research that has mainly been conducted up to this point. It is likely in the future that more idiographic approaches will become more common and may present a challenge to the explanatory power of the categories that the more nomothetically inclined researchers would prefer to use.

The final methodological issue that we need to consider is the nature of hypothesis testing in ID research. We saw, at the end of the previous section, that research has moved on from a paradigm that is restricted to correlational relationships and now also includes more hypothesis-testing studies. One aspect of this change is seen in the

growth in importance of the use of confirmatory factor analysis (Long, 1983), and LISREL in particular (Jöreskog & Sörbom, 1978). The LISREL technique, as used by, for example, Gardner (1985), attempts to specify the relations between different constructs in such a way that the causal links are specified sufficiently clearly to be subjected to a "goodness-of-fit" test. That is, instead of administering a battery of tests, and then examining the results post hoc to see if interesting patterns have turned up, LISREL requires the investigator to specify the relations that will be found *before* the analysis is done, so that the predictions that are so made can be tested. Thus, the technique encourages, and even requires, the development of models that may then be rejected if they do not account for the data that is actually found. In this way, it is hoped, the rejection or modification of an earlier model will lead to the construction of more acceptable models in the future, with the result that cumulative progress is made. Causal modeling is also a more powerful technique at the explanatory level, since it encourages the production of a functioning dynamic model that is the basis for prediction. It even allows specification of indirect paths of causation, with one variable (e.g., attitude) influencing another (such as motivation), which in turn influences the final dependent variable (e.g., achievement).

The increasing popularity of LISREL means that the analytic sophistication available to ID researchers has increased dramatically. However, there are dangers in the use of such a complex technique. For example, although one of the desirable features of causal modeling is that models and hypotheses can be rejected (so clearing the way for the development of better models), it seems currently to be the case that most investigations using LISREL do not end up rejecting the initial model. A serious problem in this regard is the possibility that LISREL may not be as effective in rejecting models, on the basis of the goodness-of-fit criterion, as was perhaps hoped for. One reason for this is the possibility that LISREL may be predisposed to accept the original model *when a small sample size is involved*. Larger sizes, in contrast, may have a bias toward rejection of the model. In other words, acceptance or rejection of the original model is a function, not only of the difference between model and reality, but also of the sample size involved. It may also be the case that LISREL is not very robust with respect to violations of the normality of distribution assumption. As a result, although LISREL has considerable appeal, it may need to be used with caution. The technique is clearly the right one for complex ID investigations, but it may be only validly usable when the right set of conditions apply (Grotjahn, personal communication, 1990).

Traditionally, ID research has used multivariate statistical techniques. This accepts that there are multiple influences on language learning success and tries to sort out the interrelationships of these various influences with one another and then of their respective contributions in accounting for language-learning success. The approach is of a research-then-theory nature to the extent that it does not set up experiments and manipulations but rather selects those aspects of reality to include in an investigation. The approach reaches an ultimate stage with the use of LISREL since this requires the investigator to prespecify the nature of the relationships between the different measures.

However, even here there is no sense of manipulation, but rather one of predicting

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relationships between measure of existing and interesting learner attributes. More recently, however, there has been something of a switch toward more manipulative, experimental approaches, potentially linked to more formal models. These take as their starting point some relevant ID attribute, but then make predictions about the operation of the attribute concerned. Wesche (1981) exemplified this with her study of the relationship between aptitude profile and language-learning success, where she contrasted the performance of learners strong in either analysis or memory when exposed to methodologies that either matched or mismatched these learning strengths. Similarly, Nation and McLaughlin (1986) examined degree of language-learning expertise as the relevant ID variable, contrasting novice language learners with bilingual learners and also with multilingual (expert) learners of an artificial language, with two presentation conditions, explicit versus implicit, being the manipulated variable.

Typically, such research used analysis of variance (ANOVA) as the appropriate statistical technique. This technique, of course, allows the investigation of "main effects" (i.e., dimensions of the experiment taken singly). For example, Wesche could have compared an aptitude effect (analytic vs. memory-oriented learners) or an instructional methodology (analytic vs. situational) effect, each taken separately. However, the value of ANOVA is that it allows *factorial designs*, that is, the inclusion of two or more dimensions in a systematic way in a research study. This allows the examination of main effects for each of the dimensions, as just described. However, it also enables the researcher to probe interactions between the dimensions of the experiment, to investigate whether *X* is particularly salient as an attribute under presentation condition *Y* (McLaughlin, 1980). For example, Wesche (1981) reported an interaction between analytic learners and methodology, with such learners doing disproportionately well and reporting greater satisfaction when taught by an analytically oriented method and the converse being true for such learners when taught with a pattern practice-based, situational method. Similarly, Nation and McLaughlin (1986) reported no significant difference between "expert" and "novice" learners when learning explicit materials but reported that such "experts" were significantly better than novices when dealing with implicitly structured material. It seemed as though the experts could impose structure even when this was not made obvious, while the novices needed the scaffolding of structured materials.

General methodological comparisons have been very disappointing in language teaching (Pennycook, 1989), consistently failing to demonstrate the superiority of one method over another. It seems clear that a possible reason for the failure to find significant effects is that such studies lump all learners together. It could well be that those learners who benefit from a particular methodology are cancelled out by those for whom it is inappropriate. Consequently, research exemplified by that of Wesche (1981) and Nation and McLaughlin (1986) is crucial if progress is to be made. Each study is an example of an aptitude-treatment interaction (ATI) design that emphasizes that it is the *combination* of learner characteristics with instructional features that is crucial for success (Cronbach & Snow, 1977). This approach—condition-seeking as it has been called (McLaughlin, 1980)—is likely to become more important in future ID research. As we discover more about learner IDs, it will become, increasing-

ly possible to examine their methods of operation, and the conditions under which they are nurtured optimally. Earlier, the distinction was made between research-then-theory and theory-then-research approaches to ESOL. The condition-seeking, ATI paradigm covered here provides an example of how this continuum may often depend on progress—earlier research is of the former type, and may employ traditional multivariate ID designs. Later research may build upon these findings and exploit the IDs revealed as important as the starting point for a more hypothesis-testing, condition-seeking ATI framework. The end point will be a theory-then-research design, but it may need a prior research-then-theory ground-clearing phase to make it viable.

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